UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/912,397	07/26/2001	Sean Chiu	LIE 142	5026

7590   08/25/2004

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EXAMINER
HUNG, YUBIN

ART UNIT	PAPER NUMBER
2625	

DATE MAILED: 08/25/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

	Application No.	Applicant(s)
Office Action Summary	09/912,397	CHIU, SEAN
	Examiner	Art Unit	
	Yubin Hung	2625	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-4* is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *26 July 2001* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All   b)☐ Some * c)☐ None of:

        1.☐ Certified copies of the priority documents have been received.

        2.☐ Certified copies of the priority documents have been received in Application No. _____.

        3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
    Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

U.S. Patent and Trademark Office
PTOL-326 (Rev. 1-04)   Office Action Summary   Part of Paper No./Mail Date 2

DETAILED ACTION

Drawings

1.   The drawings are objected to because in Fig. 2 the fitting function for the merged

interval (T_2, T_4) shown as the dashed **curve** clearly cannot be $Y = mX + C$, which is

linear.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in

reply to the Office action to avoid abandonment of the application. Any amended

replacement drawing sheet should include all of the figures appearing on the immediate

prior version of the sheet, even if only one figure is being amended. The figure or figure

number of an amended drawing should not be labeled as "amended." If a drawing figure

is to be canceled, the appropriate figure must be removed from the replacement sheet,

and where necessary, the remaining figures must be renumbered and appropriate

changes made to the brief description of the several views of the drawings for

consistency. Additional replacement sheets may be necessary to show the renumbering

of the remaining figures. The replacement sheet(s) should be labeled "Replacement

Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of

the drawing figures. If the changes are not accepted by the examiner, the applicant will

be notified and informed of any required corrective action in the next Office action. The

objection to the drawings will not be held in abeyance.

Specification

1.   The disclosure is objected to because of the following informalities:

- P.1, lines 19, 21: consider change "word" to "byte" since the size of a word

  varies from system to system

- P. 3, line 11: "to be corrected" should have been "after correction"

- P. 4, line 10: "threshold set" should have been "output threshold set"

- P. 4, line 20: it appears that the equation should have been

    $Q(Y) = Y_i$, where i satisfies the condition

    $$D(Y-Y_i) = min\{D(Y-Y_j) \mid Y_j, j= 0 \sim 2^n-1\}$$

- P. 5, line 11: as shown in Fig. 2, $F_{(h,k)}$ is not a linear function

- P, 6, line 1: "set=k+1" should have been "set k = k+1"

- Claim 1, line 2 of step (c): "approximated function" should have been "the fitting

  function"

- Claim 2: consider changing "m: resolution of input data" to "m: resolution of

  normalized input data" and adding "n: resolution of normalized output data" for

  clarity

    Appropriate correction is required.

Claim Rejections - 35 USC § 112

2.   The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly
> claiming the subject matter which the applicant regards as his invention.

3.   Claims 1-4 are rejected under 35 U.S.C. 112, second paragraph, as being

indefinite for failing to particularly point out and distinctly claim the subject matter which

applicant regards as the invention.

Specifically, in step a of claim 1, the combination of intervals is carried out only if the

condition "provided that ... intervals" is true; the meaning of the claim is not clear when

the condition is not true. If the condition is false, then the reference to "Y" in line 1 of

step c has no antecedent basis. In addition, step b implicitly makes reference to a

merged interval on the X-axis, which has no antecedent basis. Claims 2-4 inherit these

problems due to dependency.

Recommended amendment to overcome this rejection: The following are

suggested:

- o Delete "provided ... intervals" from limitation (a) and append "and a

  plurality of normalized output pixel data after correction Y quantified by n-

  bit into 2^n intervals" to "color correction function" in line 2 of claim 1

- o Amend step a by changing "a. the 2^n intervals are combined" to "a.

  combining the 2^n intervals"

       o Add text to step b to describe what a merged interval (for X) is. (Clearly it

          is the inverse mapping of the color correction function (mentioned in line

          2) of a merged interval for Y)

(For examination purpose, claims 1-4 will be interpreted according to the

amendment recommended above.)

Recommended amendment to improve the clarity of claim 1:

       o Replace "approximated function" with "fitting function"

4.   Claim 2 is rejected under 35 U.S.C. 112, second paragraph, as being incomplete

for omitting essential steps, such omission amounting to a gap between the steps. See

MPEP § 2172.01. The omitted step is

- Step a2: set $k = k+1$ (Note: An invalid step "step a2: set=k+1 was recited

    instead)

    (For examination purpose step a2 of claim 2 will be interpreted as "set k =

    k+1")

Appropriate correction is required.

Claim Rejections - 35 USC § 103

5.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set
> forth in section 102 of this title, if the differences between the subject matter sought to be patented and
> the prior art are such that the subject matter as a whole would have been obvious at the time the
> invention was made to a person having ordinary skill in the art to which said subject matter pertains.
> Patentability shall not be negatived by the manner in which the invention was made.

6.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set
> forth in section 102 of this title, if the differences between the subject matter sought to be patented and
> the prior art are such that the subject matter as a whole would have been obvious at the time the
> invention was made to a person having ordinary skill in the art to which said subject matter pertains.
> Patentability shall not be negatived by the manner in which the invention was made.

7.   Claims 1, 3, 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over

Hieda (US 5,818,521), in view of Schmidt et al. (US 5,680,476).

8.   Regard claim 1, Hieda discloses in [Figs. 3(a), 3(b); Col. 6, lines 16-44]

- the color correction function for the image reading apparatus is
  represent by a simple fitting function in each merged interval
- reading a normalized input pixel data X and locating which merged
  interval the input pixel data X lie in
  [This step is inherent to the application of a piece-wise gamma
  correction function and is true whether the input value has been
  normalized or not]
- finding the normalized output pixel data after correction Y by
  approximated function in the merged interval and using the normalized
  input pixel data X for substitution
  [Similarly, This step is also inherent and is true whether the input
  value has been normalized or not]

Hieda does not expressly disclose

- (provided that the image reading apparatus has a plurality of
  normalized output pixel data after correction Y quantified by n-bit
  into 2^n intervals,) the 2^n intervals are combined to M merged interval,
  wherein $M \leq 2^n$

However, Schmidt teaches combining output intervals. [See Fig. 2a, block labeled Q; Col. 5, lines 55-57; Col. 6, lines 58-61. Note that quantization is a function that maps input data (say X) to output data (say Y) of a smaller size (in terms of the number of bits required). Truncating the least significant k bits (a form of quantization) is equivalent to merging 2^k contiguous output intervals into one (with each interval having the form of [i, i+1]) in one step or to k iterative merging steps with each step merging pairs of adjacent intervals (i.e., by dropping one bit at a time, starting from the LSB.)

Hieda and Schmidt are combinable because they both have aspects that are from the same field of endeavor of image processing.

At the time of the invention, it would have been obvious to one of ordinary skill in the art to modify Hieda with the teaching of Schmidt by merging output intervals. The motivation would have been to reduce the size of the output data as well as to reduce the number of fitting functions needed.

Therefore, it would have been obvious to combine Schmidt with Hieda to obtain the invention of claim 1.

9.   Regarding claim 3, Hieda further discloses

*   the simple fitting function is a non-transcendental function such as
    polynomial function or exponential function
    [Col. 6, lines 38-44]

10.   Regarding claim 4, Hieda further discloses

*   image reading apparatus can be scanner, digital still camera or video
    camera
    [Fig. 1, numeral 1; Col. 4, lines 46-50]

Allowable Subject Matter

11.   Claim 2 would be allowable if rewritten to overcome the rejection(s) under 35

U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the

limitations of the base claim and any intervening claims.

12.   The following is a statement of reasons for the indication of allowable subject

matter:

13.   Regarding claim 2, the prior art of record fails to teach or suggest, alone or in

combination, a gamma correction method with the specific interval merging steps as

specified in the claim. Hieda and Schmidt, closest art of record, in combination teaches

a gamma correction that merges intervals. {See the analysis of claim 1.] However, they

do not teach the specific step (i.e., step 4 of the claim) for determining whether a

candidate interval pair should be merged.

Conclusion

14.   The prior art made of record and not relied upon is considered pertinent to

applicant's disclosure:

- Ohta et al. (US 6,130,763): This reference discloses an output value-correcting

  method that normalizes the input and output values to a range of between 0 and

  1 [Figs. 8A and 8B].

Contact Information

Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Yubin Hung whose telephone number is (703) 305-

1896. The examiner can normally be reached on 7:30 - 4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Bhavesh Mehta can be reached on (703) 308-5246. The fax phone number

for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the

Patent Application Information Retrieval (PAIR) system. Status information for

published applications may be obtained from either Private PAIR or Public PAIR.

Status information for unpublished applications is available through Private PAIR only.

For more information about the PAIR system, see http://pair-direct.uspto.gov. Should

you have questions on access to the Private PAIR system, contact the Electronic

Business Center (EBC) at 866-217-9197 (toll-free).

Yubin Hung
Paten Examiner
August 20, 2004

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